

In The Claims:

1. A direct methanol fuel cell comprising
a proton conductive membrane
a catalyst juxtaposed to said proton conductive membrane
a gas diffusion layer juxtaposed to and covering said
catalyst, said gas diffusion layer comprising a microporous
membrane
a conducting plate juxtaposed to and covering said gas
diffusion layer and having a flow field therein, said flow field
being in communication with said gas diffusion layer
whereby a fuel comprising methanol being catalytically
converted to electricity by said cell.
2. The cell of Claim 1 wherein said gas diffusion layer
further comprises a hydrophobic coating next to said catalyst.
3. The cell of Claim 1 wherein said gas diffusion layer
being an asymmetric membrane.
4. The cell of Claim 3 wherein said pores of said asymmetric
membrane having a decreasing diameter across a thickness of said
membrane and the narrower diameters being next to said catalyst.

5. The cell of Claim 1 wherein said gas diffusion layer further comprises a multilayered membrane, wherein one said layer being a thermoplastic microporous membrane and another said layer being a perm-selective layer.

6. The cell of Claim 5 wherein said perm-selective layer being a gel perm-selective material.

7. A direct methanol fuel cell comprising
a proton conductive membrane having a first face and a second face
an anodic catalyst juxtaposed to said first face
a cathodic catalyst juxtaposed to said second face
a first gas diffusion layer juxtaposed to and covering said anodic catalyst, said first gas diffusion layer comprising a thermoplastic microporous membrane
a second gas diffusion layer juxtaposed to and covering said cathodic catalyst, said second gas diffusion layer comprising a thermoplastic microporous membrane
a first conducting plate juxtaposed to and covering the first gas diffusion layer and having a flow field therein, said flow field being in communication with said first gas diffusion layer

a second conducting plate juxtaposed to and covering the second gas diffusion layer and having a flow field therein, said flow field being in communication with said second gas diffusion layer

whereby a fuel selected from the group of methanol, or methanol/water introduced into the flow field of first conducting plate diffuses to said anodic catalyst where electrons may be generated in a known manner and protons crossover said proton conductive membrane to said cathodic catalyst where said protons may be combined with oxygen in a known manner and thereby generate electricity.